Residential location patterns in a Latin American city: Santiago, Chile

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Abstract

Cultural features and residential location preferences are factors to be considered in planning more efficient housing areas in order to successfully respond to community needs. It is stated that community assessment of the urban environment is different according to income level groups and cultural features. Social equity is one of the aim of sustainability then it will be required to understand residential location preferences of each income groups; thus residential development proposals would be able to meet community expectations.

The purpose of the paper is to identify the most valuable neighbourhood attributes from community perspective in a Latin American city: Santiago de Chile. There is also defined a spatial residential location pattern based on those attributes and to compare these patterns in different incomes level household. A critical analysis is done based in this comparison.

Neighbourhood attributes analysed are land value, accessibility, criminality, environmental quality and urban density. All of them can be associated to the sustainable Development dimensions such as economic, social and environmental. Households are analysed by income. The information used has been extracted from secondary sources. Statistical Analysis and Geographical Information System tools allowed relationships to be found that explain residential location choice by income group.

Results show that there is some association grades between attributes and residential location choice by income group. Land value would explain residential location decisions of both lower and higher incomes groups, while environmental quality is highly considered by the latter. Accessibility is quite
appreciated by middle incomes groups. It is interesting to know the differences of value between incomes groups and a trade off process among attributes selection.

Understanding of the residential location trend and stated preferences as a way of attribute assessment from community would become relevant information for sustainable planning in Latin American cities.

1 Introduction

Residential location trends in Latin American cities are strongly depending on socio-economic household conditions. Trends are based on decisions according to preferences and restrictions (5). Preferences means neighbourhood attributes assessment and restrictions are basically economics. (2)

It is believed that residential location preferences are normally explained from economic side (land value and accessibility) (1), (9), (7) rather than the cultural side (social perceptions of the neighbourhood). (4), (6). That is why this research tries to address from the latter one to advance in understanding of the issue. Which is particularly relevant in the current context of globalisation and migration because of it involves cultural mixtures. (8)

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The structure of the paper is organised in four parts: first, introduction of the topic in the current context and the state of the art in the research. Secondly a brief description of Santiago city to introduce the reader. Thirdly, a comparative analysis of the residential location pattern is made among different incomes household, and finally conclusions.

2 Description of Santiago city

Santiago Metropolitan Region has 6 provinces: Santiago, Cordillera, Chacabuco, Maipo, Melipilla and Talagante. Communes divide each province and Santiago City is referred to the urbanised land in the metropolitan region. 34 communes - in which the historical centre called Santiago commune is situated - compose the Great Santiago. This research study is only referred to the Great Santiago which is the same that the Santiago province.

Santiago City is the capital of Chile founded by the Spanish Pedro de Valdivia in 1542. Currently, Santiago is located in the metropolitan region with a
population of 5.170.293 millions people (census 1992) which 97% lives in urban land and 3% live in rural land. Through time it has achieved a central position in political, social, administrative, cultural and economic terms. Its GDP is about 40.1% from national figures and it concentrates a 42% of the national population. Density reaches about 90 inhabitant/hectares although it differs upon communes (Figure 1).

Geographically speaking, Santiago is located on the Mapocho river basin at 600 meters above the sea level in a land that is composed by 85% of mountains and just a 15% of a valley. The city is situated between Los Andes Mountains with an altitude of 4.000 meters above the sea and the Cost Mountains with an altitude of 1.200 meters above the sea. Santiago has a moderate climate with four seasons: winter, spring, summer and autumn. A maximum temperature in summer is 34°C and the minimum in winter is about -2°C. Rainfalls achieve about 300 mm per year, which is determinant for the vegetal landscape (3). (Figure 2)

Urban form has spread like an oil spill cutting by urban transport corridors. The city has a mono-centric network with 3 main peripheral rings and transversal axes oriented to the historical centre. City size has 30-kms length in the East-west way and 40 Kms. length in the North-South way roughly. The city has 3 metro lines, 1 international airport, 2 national airport, 1 local airport, 1 railway station and the road systems compose the major transport infrastructure. Some island hills emerge in the valley and they have been transformed in public parks. Other public parks are a flat and circle one (O’ Higgins), and a linear and narrow one (Forestal). Significant public space in the centre of the city is Plaza de La Constitucion where is the main political building La Moneda and Paseo Bulnes, a boulevard connected to La Moneda.

Two rivers cross the city: Mapocho in the North and Maipo in the South. Landscape is perceived as a flat land with a scatter urbanised areas, mostly dried land except the richer communes with many trees along the streets. Thus dominant colour in natural landscape is light brown but greenery on the NorthEast land of Santiago City.

Transport figures are as follow: the total trips in a working day reach 8.4 million; 36% for working purposes and 31% for studying purposes. It is yield a rate of 2.12 trips per person from which 70% are made by public transport means and only 16% by private means.

Spatial distribution of population is heterogeneous by socio-economic groups. That means upper and high middle incomes group are located on the North East of the city, lower and low middle incomes groups are located on the North, West and particularly in the South of Santiago.

3 Comparative analysis of the residential location pattern among different incomes household groups

The residential location pattern for research purposes means a set of the neighbourhood attributes around residential location. The nature of the attributes comes from economic, social and environmental dimension of the sustainable development. Attributes are representatives of some major urban problems in
Latin American Cities such as inefficiency in mobility, poverty and access to urban site, safety in public spaces, air pollution, etc.

Residential population is classified in four incomes household groups: upper, high middle, low middle, and lower incomes groups. Dependent variable is socio-economic groups (household) and independent variables are accessibility, land value, criminality, density, and environmental quality.

Methodology was organised in two parts: firstly, individual analyses of attributes and secondly a comparative analyses among five attributes. Individual analyses of six variables are made to understand the spatial distribution of them. Then a comparative analysis is made between each attribute and the four socio-economic categories to visualise relative weight of the former on the latter. In other words, how and how much is the effect of the independent variable on the dependent variable.

4 Santiago case study

Spatial distribution of attributes by communes in Santiago city is shown in Figure 3. The spatial structure of socio-economic categories in Santiago City is clearly defined in Figure 3.1 Upper incomes and high middle incomes group is concentrated on the North East of the city. They have occupied about a quarter of total urbanised land while the rest of population spread on a three-quarter urbanised land. Thus lower incomes and low middle incomes group is dispersed on the North, West and South of Santiago.

In Figure 3.2, Accessibility shows a heterogeneous ring around a centre in which the further is not necessarily the worse accessibility. Indeed there are geographically closer communes around the centre with worse accessibility than the further communes. Such is the case of Las Condes, La Reina and Peñalolén. While those communes located in the south and south east of the city in which the poor and low middle incomes groups live, take more time to catch the centre.
(Central Business District)

In Figure 3.3, the spatial distribution of Land values variable shows that upper land values are concentrated on the NorthEast axis. Middle land value is located closed to the upper. Low land value appears in the South and North while the lower is located to the West and South. At first glance, it could be suggested that there is not a clear association between upper land value location and upper incomes groups location.

In Figure 3.4, Urban Criminality shows that Santiago City has a relative low homicide because low and middle level are predominant on the whole. There are only 8 of 34 communes with high levels of homicide. If it is matched with density chart it will be discovered that there is not a clear correlation between them. Spatial distribution of higher level of criminality is dispersed and it is located on the periphery and around the centre as well.

Urban Density shows in the Figure 3.5 that lowest densities are mainly located on the East of the city while the upper and middle densities are located on the West of the city. On the whole, 20 of 34 communes tend to have low densities so it can be stated that Santiago has a rather low density. That
characteristic has been possible because of the Urban Development Policies and the geomorphology of the valley.

In Figure 3.6, Environmental Quality shows a concentration of the better conditions to the East of the city. Indicator of the attribute is green area by inhabitants. On the whole, 9 of 34 communes have quite good environmental conditions while the rest of them have poor environmental conditions. If it is matched with density chart there will be found that there is an association between those attributes. Lower densities tend to be similar with higher environmental quality.

Comparative Analyses of variables by socio-economic groups can be seen in Figure 4. Accessibility to the centre of employment (Central Business District) is an attribute highly evaluated by middle incomes group. Chart reflects that the accessibility is not relevant in high middle incomes group while it is quite relevant for low middle incomes groups.

Land Value is quite relevant for upper and high middle incomes group. That would confirm urban economic principles about willingness to pay (WP) as a mayor law for land use location. In the case of Santiago the highest land value are coincident with the highest incomes group and vice-versa. There is a great correlation between those attributes and great differences of land values as well, about 7, 4 times.

Urban Criminality shows the highest level in middle incomes groups and the lowest level in upper incomes groups. Sociological review tends to link the poor with the crime, however in this case it is not exactly true, although there is a trend in this way. One possible explanation would be that residential location of middle incomes groups has two conditions to easy crime. On the one hand middle class have some fortune and on the other hand they can not afford special guard for residential neighbourhood as the upper incomes groups do. So they would be more attractive and vulnerable for robbery purposes than the rest of household.

Urban Density clearly shows an increase according to incomes level. Highest density is coincident with the lowest incomes groups and vice-versa. It is remarkable the proportion between the highest and the lowest, around 7 times. This is a conspicuous characteristic of Latin American cities. However, this pattern seems to be replicated at global scale as well. Wealthy nations tend to have lower urban densities in cities than poor nations, which tend to have the higher densities.

Environmental quality chart shows that this attribute gradually changes with incomes groups. The higher income household has the higher environmental quality and vice-versa. There is a great correlation between those attributes and a difference in value, around 10 times better conditions in upper incomes household than the lower.

5 Results and conclusions

Results mentioned above reflect that attributes have different value for each incomes group. A sort of residential location pattern can be defined in a
metropolitan city as Santiago. In brief, the residential location pattern changes according to income categories as follows:

- High incomes residential areas are characterised by low densities, high environmental conditions and a high land value. On the other hand, topology is another factor considered in location such as similar incomes neighbourhood, topographical barriers as a hill, a river, and a mountain.
- Middle incomes residential areas are characterised by a good accessibility to the centre and a high criminality. It seems to be a trade-off process between positives and negatives attributes.
- Lower incomes residential areas are characterised by the highest urban densities, the lowest land value and the lowest environmental conditions.

A gap between the rich and the poor residential areas is observed in attributes such as environmental quality, Urban density and land value. Other attributes such as criminality and accessibility are quite fair comparatively with others.

To conclude classical interpretations derived from urban geography have stated for years a sort of assumptions about urban location, which it may be not true in the case of Santiago City. One of them is accessibility decrease from the centre to the periphery; another one is the poor live in the periphery in which land value is the lowest. None of them can be proved in this case study.

It is expected a further research in other Latin American cities in order to compare and to contrast the same explanatory attributes of the residential location in order to find a common pattern. It would be useful for planning purposes.

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Figure 1: Santiago city, panoramic view

Figure 2: Geomorphology of the Santiago valley

Source: IGM.1983. Adapted by Cárdenas, 2002
Figure 3: Spatial distribution of attributes by communes in Great Santiago

Figure N° 3.1
SOCIO-ECONOMIC LEVEL
(Incomes: US $ / month / household)

Very Low [250 – 600)
Low [600 – 1000)
Middle [1000 – 1700)
High [1700 – 4700)
Very High [4700 – 8000]

Figure N° 3.2
ACCESSIBILITY TO THE CENTER
(Distance / time: minutes by bus)

Very Low [52 – 61)
Low [43 – 52)
Middle [34 – 43)
High [25 – 34)
Very High [16 – 25]

Figure N° 3.3
URBAN LAND USE
(US $ / m²)

Very Low [19 – 150)
Low [150 – 281)
Middle [281 – 412)
High [412 – 543)
Very High [543 – 674]

Figure N° 3.4
URBAN CRIMINALITY
(N° homicide / 100.000 inhab. / year)

Very Low [0 – 1)
Low [1 – 2)
Middle [2 – 3)
High [3 – 4)
very High [4 – 5]

Figure N° 3.5
URBAN DENSITY
(N° inhabitantes / ha.)

very Low [26 – 84)
Low [84 – 142)
Middle [142 – 200)
High [200 – 258)
Very High [258 – 316]

Figure N° 3.6
ENVIRONMENTAL QUALITY
(m² green area / inhab.)

very Low [1 – 8)
Low [8 – 15)
Middle [15 – 22)
High [22 – 29)
very High [29 – 36]

Source: Cárdenas, 2000
Figure 4: Comparative Analyses of attributes by socio-economic groups

- **Urban Accessibility & Incomes**
  - Great Santiago - Chile (1998)
  - Time (minutes to CBD) vs. Household by Incomes (US $/month/household)

- **Land Value & Incomes**
  - Great Santiago - Chile (1998)
  - Land Value vs. Household by Incomes Level (US $/month/household)

- **Urban Criminality & Incomes**
  - Great Santiago - Chile (1998)
  - Deaths per 100000 people/year vs. Household by Incomes Level (US $/month/household)

- **Urban Density & Incomes**
  - Great Santiago - Chile (1998)
  - Density (Hab./km²) vs. Household by Incomes Level (US $/month/household)

- **Environmental Quality**
  - Great Santiago - Chile (1998)
  - Green Areas Surfac (m²/habitant) vs. Household by Incomes Level (US $/month/household)
References


